CLAIMS

1. A method for preparing a protective jacket for use on flexible, kink resistant, fluid transfer hose constructions, wherein the method comprises preparing the protective jacket using a thermoplastic elastomeric material that comprises a reaction product of:

(a) at least one rheologically stable polyamide resin having a melting point or glass transition temperature of from about 25 °C to about 275 °C;

(b) a diorganopolysiloxane gum having a plasticity of at least 30 and having an average of at least two alkenyl groups in its molecule, wherein the weight ratio of the diorganopolysiloxane gum to the polyamide resin(s) ranges from about 40:60 to about 75:25;

(c) a compatibilizer selected from the group of:

i. a coupling agent having a molecular weight of less than 800 which contains at least two groups independently selected from ethylenically unsaturated group, epoxy, anhydride, silanol, carboxyl, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule,

ii. a functional diorganopolysiloxane having at least one group selected from epoxy, anhydride, silanol, carboxyl, amine, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule, or

iii. a copolymer comprising at least one diorganopolysiloxane block and at least one block selected from polyamide, polyether, polyurethane, polyurea, polycarbonate or polyacrylate;

(d) an organohydrido silicon compound which contains an average of at least two silicon-bonded hydrogen groups in its molecule; and

(e) a hydrosilation catalyst.

2. The method of claim 1, wherein the rheologically stable polyamide resin(s) of the thermoplastic elastomeric material is present in an amount ranging from about 30 to about 60 parts by weight, based on the total weight of the thermoplastic elastomeric material.

3. The method of claim 2, wherein the rheologically stable polyamide resin(s) is a mixture of polyamides comprising (*i*) from about 65 to about 75 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6 resin; and (*ii*) from about 35 to about 25 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6/12 resin.

4. The method of claim 1, wherein the diorganopolysiloxane gum of the thermoplastic elastomeric material is present in an amount ranging from about 40 to about 70 parts by weight, based on the total weight of the thermoplastic elastomeric material, and wherein the weight ratio of the diorganopolysiloxane gum to the polyamide resin(s) ranges from about 40:60 to about 70:30.

5. The method of claim 4, wherein the diorganopolysiloxane gum is a polydimethysiloxane material.

6. The method of claim 1, wherein the compatibilizer of the thermoplastic elastomeric material is present in an amount ranging from about 0.5 to about 5 parts by weight, per 100 parts of the polyamide resin(s).

7. The method of claim 6, wherein the compatibilizer is an epoxy functional silicone fluid compatibilizer.

8. The method of claim 1, wherein the thermoplastic elastomeric material further comprises one or more silicone fluids, antioxidants and colorants.

9. The method of claim 1, wherein the thermoplastic elastomeric material is cross-linked.

10. A flexible, kink resistant, fluid transfer hose construction comprising:

(a) a heat and chemically resistant inner tube; and

(b) a flexible and abrasion-resistant protective jacket formed on the inner tube, wherein the hose construction

demonstrates a flexural modulus at 23 °C (as measured by ASTM D790) of less than or equal to about 330 megapascals.

11. The hose construction of claim 10, which demonstrates a flexural modulus at 23 °C (as measured by ASTM D790) of less than or equal to about 320 megapascals.

12. The hose construction of claim 11, which demonstrates a flexural modulus at 23 °C (as measured by ASTM D790) of from about 200 to about 320 megapascals.

13. The hose construction of claim 10, wherein the heat and chemically resistant inner tube is prepared from an extrudable or moldable polymeric material that has a compressive strength (as measured by ASTM D695) of from about 3.4 to about 310 megapascals.

14. The hose construction of claim 13, wherein the polymeric material is selected from the group of fluorocarbon polymers, polyamides, polyethylene resins, polyesters, polyimides, polypropylene, polyvinylchloride, silicones, and mixtures thereof.

15. The hose construction of claim 14, wherein the polymeric material is a fluorocarbon polymer selected from the group of polytetrafluoroethylene, copolymers of tetrafluoroethylene and hexafluoropropylene, perfluoroalkoxyl resins and polymers of ethylene-tetrafluoroethylene.

16. The hose construction of claim 10, wherein the heat and chemically resistant inner tube has a wall thickness ranging from about 0.13 to about 1.9 millimeters, and an inner diameter ranging from about 2.5 to about 50.8 millimeters.

17. The hose construction of claim 10, wherein the flexible and abrasion-resistant protective jacket is prepared from a thermoplastic elastomeric material.

18. The hose construction of claim 17, wherein the thermoplastic elastomeric material is formed from optionally compatibilized polyamide resins.

19. The hose construction of claim 18, wherein the thermoplastic elastomeric material comprises a reaction product of:

(a) at least one rheologically stable polyamide resin having a melting point or glass transition temperature of from about 25 °C to about 275 °C;

(b) a diorganopolysiloxane gum having a plasticity of at least 30 and having an average of at least two alkenyl groups in its molecule, wherein the weight ratio of the diorganopolysiloxane gum to the polyamide resin(s) ranges from about 40:60 to about 75:25;

(c) a compatibilizer selected from the group of:

i. a coupling agent having a molecular weight of less than 800 which contains at least two groups independently selected from ethylenically unsaturated group, epoxy, anhydride, silanol, carboxyl, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule,

ii. a functional diorganopolysiloxane having at least one group selected from epoxy, anhydride, silanol, carboxyl, amine, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule, or

iii. a copolymer comprising at least one diorganopolysiloxane block and at least one block selected from polyamide, polyether, polyurethane, polyurea, polycarbonate or polyacrylate;

(d) an organohydrido silicon compound which contains an average of at least two silicon-bonded hydrogen groups in its molecule; and

(e) a hydrosilation catalyst.

20. The hose construction of claim 19, wherein the rheologically stable polyamide resin(s) is present in the thermoplastic elastomeric material in an amount ranging from about 30 to about 60 parts by weight, based on the total weight of the thermoplastic elastomeric material.

21. The hose construction of claim 20, wherein the rheologically stable polyamide resin(s) is a mixture of polyamides comprising (*i*) from about 65 to about 75 parts by weight, based on the total weight of the polyamide mixture, of

a nylon 6 resin; and (*ii*) from about 35 to about 25 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6/12 resin.

22. The hose construction of claim 19, wherein the diorganopolysiloxane gum is present in the thermoplastic elastomeric material in an amount ranging from about 40 to about 70 parts by weight, based on the total weight of the thermoplastic elastomeric material, and wherein the weight ratio of the diorganopolysiloxane gum to the polyamide resin(s) ranges from about 40:60 to about 70:30.

23. The hose construction of claim 22, wherein the diorganopolysiloxane gum is a polydimethysiloxane material.

24. The hose construction of claim 19, wherein the compatibilizer is present in the thermoplastic elastomeric material in an amount ranging from about 0.5 to about 5 parts by weight, per 100 parts of the polyamide resin(s).

25. The hose construction of claim 24, wherein the compatibilizer is an epoxy functional silicone fluid compatibilizer.

26. The hose construction of claim 19, wherein the thermoplastic elastomeric material further comprises one or more silicone fluids, antioxidants and colorants.

27. The hose construction of claim 19, wherein the thermoplastic elastomeric material is cross-linked.

28. The hose construction of claim 19, wherein the flexible and abrasion-resistant protective jacket has a wall thickness ranging from about 0.05 to about 2.54 millimeters, and an inner diameter ranging from about 3.2 to about 19.0 millimeters.

29. The hose construction of claim 19, wherein the heat and chemically resistant inner tube is prepared from an extrudable polytetrafluoroethylene material and wherein the flexible and abrasion-resistant protective jacket is prepared from a thermoplastic elastomeric material.

30. The hose construction of claim 19, which further comprises at least one reinforcing or barrier layer.

31. The hose construction of claim 30, wherein the reinforcing or barrier layer comprises one or more metal layers laminated to an outer surface

of the inner tube.

32. The hose construction of claim 30, wherein the reinforcing or barrier layer comprises an interwoven braid or spiral winding of one or more synthetic fibrous materials selected from the group of aramid fibers, polyethylene fibers, poly(p-phenylene-2,6-benzobisoxazole) fibers, polyvinyl alcohol fibers, and mixtures thereof.

33. The hose construction of claim 30, wherein the reinforcing or barrier layer comprises an interwoven braid or a spiral winding of a metal wire.

34. The hose construction of claim 30, wherein the reinforcing or barrier layer has a wall thickness ranging from about 0.025 to about 2.000 millimeters, and an inner diameter ranging from about 3.2 to about 100.0 millimeters.

35. A hose assembly comprising:

(a) a flexible, kink resistant, fluid transfer hose construction comprising (i) a heat and chemically resistant inner tube, and (ii) a flexible and abrasion-resistant protective jacket formed on the inner tube, wherein the hose construction demonstrates a flexural modulus at 23 °C (as measured by ASTM D790) of less than or equal to about 330 megapascals; and

(b) coupling means.

36. The hose assembly of claim 35, which demonstrates a tensile pull strength (as measured by U.S. DOT MVSS § 571.106 S5.3.4) of at least about 1445 Newtons.

37. The hose assembly of claim 36, which demonstrates a tensile pull strength (as measured by U.S. DOT MVSS § 571.106 S5.3.4) of at least about 5382 Newtons.

38. The hose assembly of claim 37, which demonstrates a tensile pull strength (as measured by U.S. DOT MVSS § 571.106 S5.3.4) of at least about 5471 Newtons.

39. A flexible and abrasion resistant thermoplastic elastomeric material suitable for use as a protective jacket on flexible, kink resistant, fluid

transfer hose constructions, wherein the thermoplastic elastomeric material comprises a reaction product of:

(a) a mixture of polyamides comprising (*i*) from about 65 to about 75 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6 resin; and (*ii*) from about 35 to about 25 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6/12 resin;

(b) a diorganopolysiloxane gum having a plasticity of at least 30 and having an average of at least two alkenyl groups in its molecule, wherein the weight ratio of the diorganopolysiloxane gum to the polyamide resin(s) ranges from about 40:60 to about 75:25;

(c) a compatibilizer selected from the group of:

i. a coupling agent having a molecular weight of less than 800 which contains at least two groups independently selected from ethylenically unsaturated group, epoxy, anhydride, silanol, carboxyl, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule,

ii. a functional diorganopolysiloxane having at least one group selected from epoxy, anhydride, silanol, carboxyl, amine, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule, or

iii. a copolymer comprising at least one diorganopolysiloxane block and at least one block selected from polyamide, polyether, polyurethane, polyurea, polycarbonate or polyacrylate;

(d) an organohydrido silicon compound which contains an average of at least two silicon-bonded hydrogen groups in its molecule; and

(e) a hydrosilation catalyst.

40. A method for preparing a thermoplastic elastomeric material suitable for use as a protective jacket on flexible, kink resistant, fluid transfer hose constructions, which comprises:

(I) mixing

(a) a mixture of polyamides comprising (*i*) from about 65 to about 75 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6 resin; and (*ii*) from about 35 to about 25 parts by weight, based on the total weight of the polyamide mixture, of a nylon 6/12 resin;

(b) a diorganopolysiloxane gum having a plasticity of at least 30 and having an average of at least two alkenyl groups in its molecule, wherein the weight ratio of the diorganopolysiloxane gum to the polyamide resin(s) ranges from about 40:60 to about 75:25;

(c) a compatibilizer selected from the group of:

i. a coupling agent having a molecular weight of less than 800 which contains at least two groups independently selected from ethylenically unsaturated group, epoxy, anhydride, silanol, carboxyl, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule,

ii. a functional diorganopolysiloxane having at least one group selected from epoxy, anhydride, silanol, carboxyl, amine, oxazoline or alkoxy having 1 to 20 carbon atoms, in its molecule, or

iii. a copolymer comprising at least one diorganopolysiloxane block and at least one block selected from polyamide, polyether, polyurethane, polyurea, polycarbonate or polyacrylate;

(d) an organohydrido silicon compound which contains an average of at least two silicon-bonded hydrogen groups in its molecule; and

(e) a hydrosilation catalyst,

components (d) and (e) being present in an amount sufficient to cure component (b); and .

(II) curing component (b).